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NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/NVP/W.No.07/CSR-10/1621/CEMENT/2016-17 Date: 07.10.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
*NAME OF THE WORK	:	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	:	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
SAMPLE ID	:	Cement – Sample 2
SAMPLE RECEIVED ON	:	05.10.2016
PERIOD OF TESTING	:	05.10.2016 to 07.10.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	29.50 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	150 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	475 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

A.E.E.

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****

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Quality Manager

A.E.E.(W.7)

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Job No.: CTCE/BBMP/NVP/W.No.07/CSR-10/1621/SAND-Gradation/2016-17 : 07.10.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. Ninganagowda .V. Patil,**
#17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.

*** Name of Work** : Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KSD/PR/250/2016-17 Dated: 05.10.2016

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates – Sample 2

Sample Received on : 05.10.2016

Date of Testing : 07.10.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	93.20	90-100	90-100	90-100	95-100
2.36	74.70	60-95	75-100	85-100	95-100
1.18	54.50	30-70	55-90	75-100	90-100
600 Micron	25.90	15-34	35-59	60-79	80-100
300 Micron	12.20	5-20	8-30	12-40	15-50
150 Micron	4.00	0-10	0-10	0-10	0-15

*Information is furnished by the Customer/Representative.

Remarks : This sample is under Zone-I specific limits.

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Quality Manager

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Job No.: CTCE/BBMP/NVP/W.No.07/CSR-10/1621/AGG/GR/2016-17 : 07.10.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	: **Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
* Name of Work	: Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm) – Sample 2
Sample Received on	: 05.10.2016
Date of Testing	: 07.10.2016

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	98.30	95-100	85-100
20	35.30	30-70	0-20
10	12.50	10-35	0-5
4.75	3.40	0-5	-

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A.E.E.

* Information is furnished by the Customer/Representative

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Remarks : This sample is under Graded specific limits.

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Job No.: CTCE/BBMP/NVP/W.No.07/STEEL/2016-17 13.10.2016

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	:	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	:	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Date of Test	:	13.10.2016
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	10	0.62	513	556	13.30	O.K	O.K

A.E.E.

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/NVP/W.No.07/STEEL/2016-17 13.10.2016

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	:	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	:	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Date of Test	:	13.10.2016
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	12	0.89	515	558	13.55	O.K	O.K

A6-W-7 A.E.E.

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T-2377

Job No.: CTCE/BBMP/NVP/W.No.07/CSR-10/1621/CUBE/2016-17 14.11.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*Agency	: **Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
*Name of the work	: Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
*Sample ID	: Cement Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
*Grade of Concrete	: M_{20}
Compressive Strength as on	: 28th day
Sample Received on	: 14.11.2016

Sl.No.	*Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	17.10.2016	14.11.2016	8.263	496.3	22.06
2	17.10.2016	14.11.2016	8.357	516.9	22.97
3	17.10.2016	14.11.2016	8.145	485.2	21.56

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&
A.E.E.

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M Lokesh. N.D
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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/Gradation/2016-17 10.11.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. Ninganagowda .V. Patil,**
#17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.

Name of Work : Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KSD/PR/250/2016-17 Dated: 05.10.2016

Date of Testing : 10.11.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	85	85	1.7	98.3	95-100
22.4	1125	1210	24.2	75.8	60-80
11.2	985	2195	43.9	56.1	40-60
4.75	950	3145	62.9	37.1	25-40
2.36	655	3800	76.0	24.0	15-30
0.600	625	4425	88.5	11.5	8-22
0.075	360	4785	95.7	4.3	0-8

AG-LU / & A.E.E.

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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/Gradation/2016-17 10.11.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. Ninganagowda .V. Patil,**
#17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.

Name of Work : Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KSD/PR/250/2016-17 Dated: 05.10.2016

Date of Testing : 10.11.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	65	65	1.3	98.7	95-100
22.4	1125	1190	23.8	76.2	60-80
11.2	955	2145	42.9	57.1	40-60
4.75	935	3080	61.6	38.4	25-40
2.36	615	3695	73.9	26.1	15-30
0.600	650	4345	86.9	13.1	8-22
0.075	315	4660	93.2	6.8	0-8

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GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. Ninganagowda .V. Patil,**
#17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.

Name of Work : Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.

Reference : AEE/KSD/PR/250/2016-17 Dated: 05.10.2016

Date of Testing : 10.11.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	105	105	2.1	97.9	95-100
22.4	1135	1240	24.8	75.2	60-80
11.2	960	2200	44.0	56.0	40-60
4.75	985	3185	63.7	36.3	25-40
2.36	615	3800	76.0	24.0	15-30
0.600	640	4440	88.8	11.2	8-22
0.075	385	4825	96.5	3.5	0-8

AE-127
A.E.E.

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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/AIV/2016-17 11.11.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	355	360	
4	Aggregate Impact value = percent fines	21.19	21.82	
	100* (W_2/W_1)%			**21.50**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/AIV/2016-17 11.11.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	355	360	
4	Aggregate Impact value = percent fines	22.62	22.31	
	100* (W_2/W_1)%			22.46

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/AIV/2016-17 11.11.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	355	360	
4	Aggregate Impact value = percent fines	22.31	20.98	
	100* (W_2/W_1)%			21.65

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/S-T/2016-17 11.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	11.11.2016

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.53%**

Elongation Index = **13.84%**

Result : Combined Flakiness & Elongation index 26.37%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/S-T/2016-17 11.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	11.11.2016

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.85%**

Elongation Index = **13.47%**

Result : Combined Flakiness & Elongation index 25.32%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/NVP/W.No.07/WMM/S-T/2016-17 11.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	11.11.2016

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.69%**

Elongation Index = **13.74%**

Result : Combined Flakiness & Elongation index **26.43%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/NVP/W.No.07/CSR-10/1621/QB(SDBC)/2016-17 18.11.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
*NAME OF THE WORK	:	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	:	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	16.11.2016
DATE OF TESTING	:	18.11.2016

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2006
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	92	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	298	Min. 220

*Information furnished by the Customer/Representative

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⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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VISHWANATH C.
Quality Manager

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/AIV/2016-17 18.11.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.16	21.30	21.73

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	392	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	305	299	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.19	22.94	22.57

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	387	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.96	21.30	**21.63**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	18.11.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.08	22.42	22.25

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of Work	: Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 18.11.2016

Result : Flakiness Index = **12.63%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index **26.48%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/Shape_T/2016-17 : 18.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of Work	: Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 18.11.2016

Result : Flakiness Index = **11.57%**

Elongation Index = **13.63%**

Result : Combined Flakiness & Elongation index **25.20%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of Work	: Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 18.11.2016

Result : Flakiness Index = **12.85%**

Elongation Index = **13.96%**

Result : Combined Flakiness & Elongation index **26.81%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/Shape_T/2016-17 : 18.11.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of Work	: Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 18.11.2016

Result : Flakiness Index = **11.74%**

Elongation Index = **13.89%**

Result : Combined Flakiness & Elongation index **25.63%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/Stripping/2016-17 21.11.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	21.11.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.27	96.73
2	3.4		
3	3.1		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/Sp_Wa/2016-17 21.11.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	21.11.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2027	2025	2026	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1272	1270	1271	
4	Weight of saturated surface dry aggregate in air	W_3 g	2011	2013	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	739	743	744	
6	Weight of oven dried aggregate	W_4 g	1995	1999	1998	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.700	2.690	2.685	2.692
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.759	2.742	2.748	2.750
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.80%	0.70%	0.85%	0.78%

A.E.E.

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/Bit/2016-17 21.11.2016

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC:SP:-1984

CUSTOMER	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
NAME OF THE WORK	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
SAMPLE I/D	Roads in Varma Layout Amruthahalli Ward No.07
DATE OF TESTING	21.11.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

Note:

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Þ The results indicated above are based on the tests carried out on the samples received in the laboratory

Þ Any Query regarding the report must be reported within 30 days from the date of testing.

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/Bit/2016-17 21.11.2016

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
NAME OF THE WORK	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
SAMPLE I/D	Roads in Varma Layout Amruthahalli Ward No.07
DATE OF TESTING	21.11.2016

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	26.53	5.59	5.59	94.41	90-100
4.75	261.4	55.03	60.62	39.38	35-51
2.36	54.23	11.42	72.03	27.97	24-39
1.18	36.58	7.70	79.73	20.27	15-30
0.3	34.12	7.18	86.92	13.08	9-19
0.075	37.58	7.91	94.83	5.17	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.52	7.70	7.70	92.30	90-100
4.75	255.4	53.88	61.59	38.41	35-51
2.36	55.63	11.74	73.32	26.68	24-39
1.18	35.82	7.56	80.88	19.12	15-30
0.3	34.12	7.20	88.08	11.92	9-19
0.075	32.63	6.88	94.96	5.04	3-8

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/AGG/2016-17 21.11.2016

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the Work	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	21.11.2016

Total Weight of Sample: **5250** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	325	6.2	6.19	93.81	90-100	
4.75	2645	50.4	56.57	43.43	35-51	
2.36	745	14.2	70.76	29.24	24-39	
1.18	495	9.4	80.19	19.81	15-30	
0.3	325	6.2	86.38	13.62	9-19	
0.075	390	7.4	93.81	6.19	3-8	

Total Weight of Sample: **5350** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	385	7.2	7.20	92.80	90-100	
4.75	2565	47.9	55.14	44.86	35-51	
2.36	955	17.9	72.99	27.01	24-39	
1.18	515	9.6	82.62	17.38	15-30	
0.3	265	5.0	87.57	12.43	9-19	
0.075	320	6.0	93.55	6.45	3-8	

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Job No.: CTCE/BBMP/NVP/W.No.07/SDBC/Stability/2016-17 21.11.2016

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Mr. Ninganagowda .V. Patil,** #17/7, Sri. Krishna Nilaya, 2nd Main, Ganganagara Layout, Ganganagara, R.T. Nagara (P), Bangalore – 32.
Name of the work	:	Improvements to Roads and Drains in Varma Layout Amruthahalli in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	:	AEE/KSD/PR/250/2016-17 Dated: 05.10.2016
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	21.11.2016

The results of the tests conducted on the bituminous mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, at 60° C, Kn	10.25	10.55	8.2 Kn (min)
2	Marshal flow at 60° C, mm	2.55	2.30	2 – 4
3	Percent air voids	3.60	4.45	3 – 5
4	Percent voids in mineral aggregates (VMA %)	14.25	14.35	13 - 15
5	Percent voids filled with Bitumen (VFB %)	72.40	72.85	65 – 78
6	Density, g/cc	2.26	2.27	---

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⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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